Remarks/Arguments:

This is a reply to the office action of May 29.

The claims (1 - 17 and 20 - 24) stand rejected over Taal in view of Wang. The rejections are respectfully traversed for reasons set out below.

First, it is greatly appreciated that the examiner acknowledges that Taal fails to teach an adhesive composition comprising sulfonated copolyester (p.7 of the office action). However, the further analysis of the teaching of Taal compared to the present invention (p. 5 - 6) is traversed for the following reasons:

1. Dermatological coating

What Taal teaches with respect to a "dermatologically-compatible coating" in claim 9 has nothing to do with the adhesive that is illustrated in Table 1 of Taal. What claim 9 discloses is

> "A method of bonding substrates ... comprising the steps of applying to
> one or more of said substrates the hot melt adhesive of claim 1 ...
> wherein the [substrates] are finished with a dermatologically compatible
> coating... ."

Thus, what Taal discloses is forming a laminate of substrates by using the adhesive disclosed in Table 1; in a finishing step a "*dermatologically compatible lotion*" is applied onto this laminate. This is outlined in detail in col. 7, lines 57 - 64 and in the lower half of Table 1. The adhesive joint in between the substrates is to be tested for stability in the presence of a dermatologically compatible coating on the top sheet (*cf.* col 2, lines 20 - 25).

Regarding the rejection of claim 20, we agree, of course, that Taal uses the adhesive for joining substrates; however, since the present adhesive as recited in claim 11 is deemed novel and inventive, claim 20 is deemed allowable as well.

Claim 21 is directed to a method of joining a substrate to skin by means of this adhesive. The adhesive of Taal is used for joining two substrates which are explicitly not skin (*cf.* Taal, claim 9). As noted above, the dermatologically compatible coating has nothing to do with the adhesive of Taal, or with the adhesive of the present invention. Moreover, the adhesive of Taal is not in contact with skin at all.

2. Wet peel strength

Regarding claim 17, the examiner's reasoning on p. 6 with respect to the wet peel strength according to the present invention and the peel strength of Taal is, in our view, wrong. The test method of Taal and the test method for *wet* peel strength according to present invention are fundamentally different:

Taal describes a test for peel strength at "20°C / 50% relative humidity". This is just a common ambient atmospheric condition (see attached excerpt from Wikipedia).

In striking contrast, the present invention explicitly describes a wet peel strength. Although the examiner copied the entire test method from US 5,028,485 that is referred to in the present application, he seems to have focused on just the first sentence:

"Samples are conditioned for 24 hours at 23°C ± 20C at 50% relative humidity, prior to starting the test."

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Even from this very first sentence, it is apparent that 50% humidity is not the test specification but rather a conditioning environment *prior* to the test. The text continues:

> "After 30 min. an excess (minimal 2ml per specimen) of distilled water is added over the whole length at one side of the adhesive tape, and the water is allowed to penetrate underneath the adhesive tape to other side."

Thus, in simple words, liquid water is poured over the adhesive joint, it is allowed to penetrate, and only thereafter is the peel strength determined. What wet peel strength is, is clearly defined in the present application.

Since Taal fails to disclose any such wet peel strength values at all, the examiner is stretching to say that "the values disclosed in Taal et al. and the values as claimed can be properly compared." In short, Taal simply determines peel strength under normal ambient atmospheric conditions, whereas the wet peel strength according to the present invention is determined after the sample has been immersed with liquid water. The situations are substantially different and not comparable.

3. Combination of Taal and Wang.

The examiner correctly acknowledges that Taal fails to teach an adhesive composition comprising sulfonated copolyester (p.7 of the office action).

Turning now to Wang, it has to be noted that Wang fails to disclose the specific elastomeric block copolymers of the A-B and A-B-A type to which claim 11 is meanwhile restricted. What Wang in fact discloses is an adhesive composition that comprises sulfonated copolyester and very specific block copolymers that are different from the presently claimed ones.

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The Examiner's argument for obviousness is as follows (see p. 8):

> "In view of the substantially identical field of endeavor of Taal et al. and Wang, and motivated by the expectation of success of developing an adhesive composition having the advantages of water – water-dispersibility, water- releasability and repulpability (Wang, col. 1, line 9-22), it would have been obvious to one of ordinary skill in art to incorporate the sulfonated polyester copolymer(s) teachings into Taal et al. to obtain the invention of claims 11-17, 20-24."

This is way not a reasonable assessment of obviousness.

First, the examiner argues as if Taal and Wang differ only in the presence of the sulfonated copolyester. This is not the case.

The claimed specific elastomeric block copolymers of specific diblock content are clearly not taught in Wang. The teaching of Wang with respect to the polymer is explicitly restricted to *ethylene glycol* and *propylene glycol* and block copolymers thereof; nothing more or less (*cf.* claims 5 and 6 of Wang, also cited by the examiner). Such polymers are not covered by claim 11 of the present application.

Wang does not attribute any specific effect to the sulfonated copolyester(s) in his specific compositions, and thus would not motivate a skilled artisan take the sulfonated copolyesters of Wang and incorporate them into the composition of Taal, i.e. into a completely different polymer composition. The polymeric environment is fundamentally different.

The examiner alleges the skilled artisan would be "motivated by the expectation of success of developing an adhesive composition having the advantages of water-

solubility, water-dispersibility, water-releasability and repulpability". However, that would obviously require that this effect be attributed to the sulfonated copolyester, and that the skilled artisan could expect this.

However, the exact opposite is the truth: incorporating sulfonated copolyester into the compositions of Taal does not result in water-solubility and water-releasability in the specific polymeric environment of the present invention; rather, a strikingly improved wet-peel strength is achieved.

The examiner has not explained why a skilled artisan should have expected improved wet peel strength from a component of the composition of Wang, which composition is explicitly aimed to achieve the contrary, i.e. to improve water-solubility and water-releasability.

It is the composition of Wang in total that has a beneficial effect on water-solubility, water-dispersibility, water-releasability and repulpability. To extract one isolated component thereof (the sulfonated copolyester) and to incorporate it into the composition of Taal is unmotivated feature-picking, assessing inventive merit in hindsight.

Nothing could be more surprising than to:

      i) take an isolated component of a composition (the sulfonated copolyesters of Wang), which composition is aimed to be water-soluble and water-releasable, to

      ii) integrate it into a different composition (Taal) and to

      iii) achieve, based on this very component, quite the contrary of what Wang achieves, i.e., improved wet peel strength.

We submit that it would be a more correct interpretation of what Wang and Taal in fact teach the skilled artisan, to conclude that the invention recited in claim 11 and the

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other claims now presented would not have been obvious, at the time the invention was made, to a person having ordinary skill in the field of this invention.

We believe the claims are patentable over the prior art of record, and that this application is proper condition for allowance.

Respectfully submitted,

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Humidity

From Wikipedia, the free encyclopedia

Humidity is the amount of water vapor in the air. In daily language the term "humidity" is normally taken to mean relative humidity. Relative humidity is defined as the ratio of the partial pressure of water vapor in a parcel of air to the saturated vapor pressure of water vapor at a prescribed temperature. Humidity may also be expressed as absolute humidity and specific humidity. Relative humidity is an important metric used in forecasting weather. Humidity indicates the likelihood of precipitation, dew, or fog. High humidity makes people feel hotter outside in the summer because it reduces the effectiveness of sweating to cool the body by preventing the evaporation of perspiration from the skin. This effect is calculated in a heat index table.

Absolute humidity

Absolute humidity is the quantity of water in a particular volume of air. The most common units are grams per cubic meter, although any mass unit and any volume unit could be used. Pounds per cubic foot is common in the U.S., and occasionally even other units mixing the English and metric systems are used.

If all the water in one cubic meter of air were condensed into a container, the container could be weighed to determine absolute humidity. The amount of vapor in that cube of air is the absolute humidity of that cubic meter of air. More technically: the mass of water vapor m_w, per cubic meter of air, V_a.

$$AH = \frac{m_w}{V_a}$$

Absolute humidity ranges from 0 gram per cubic meter in dry air to 30 grams per cubic meter (0.03 ounce per cubic foot) when the vapour is saturated at 30 °C.[1] (http://www.britannica.com/eb/article-53259/climate#292984.hook) (See also Absolute Humidity table (http://www.tis-gdv.de/tis_e/misc/klima.htm))

The absolute humidity changes as air pressure changes. This is very inconvenient for chemical engineering calculations, e.g. for dryers, where temperature can vary considerably. As a result, absolute humidity is generally defined in chemical engineering as mass of water vapor per unit mass of dry air, also known as the mass mixing ratio (see below), which is much more rigorous for heat and mass balance calculations. Mass of water per unit volume as in the equation above would then be defined as **volumetric humidity**. Because of the potential confusion, British Standard BS 1339 (revised 2002) suggests avoiding the term "absolute humidity". Units should always be carefully checked. Most humidity charts are given in g/kg or kg/kg, but any mass units may be used.

Mixing ratio or humidity ratio

Mixing or *humidity ratio* is expressed as a ratio of kilograms of water vapor, m_w, per kilogram of dry air, m_d, at a given pressure. The colloquial term Moisture Content is also used instead of Mixing/Humidity Ratio. Humidity Ratio is a standard axis on psychrometric charts, and is a useful parameter in psychrometrics calculations because it does not change with temperature except when the air cools below dewpoint

That ratio can be given as:

$$MRi = \frac{m_w}{m_d}$$

Partial pressure of water vapor and air can also be used to express the ratio.

Relative humidity

Relative humidity is defined as the ratio of the partial pressure of water vapor in a gaseous mixture of air and water vapor to the saturated vapor pressure of water at a given temperature. Relative humidity is expressed as a percentage and is calculated in the following manner:

$$RH = \frac{p_{(H_2O)}}{p^*_{(H_2O)}} \times 100\%$$

where

$p_{(H_2O)}$ is the partial pressure of water vapor in the gas mixture;

$p^*_{(H_2O)}$ is the saturation vapor pressure of water at the temperature of the gas mixture; and

RH is the relative humidity of the gas mixture being considered.

Relative humidity is often mentioned in weather forecasts and reports, as it is an indicator of the likelihood of precipitation, dew, or fog. In hot summer weather, it also increases the apparent temperature to humans (and other animals) by hindering the evaporation of perspiration from the skin as the relative humidity rises.

Specific humidity

Specific humidity is the ratio of water vapor to air (including water vapor and dry air) in a particular volume. Specific humidity ratio is expressed as a ratio of kilograms of water vapor, m_w, per kilogram of mixture, m_t.

That ratio can be showed as:

$$SH = \frac{m_w}{m_a + m_w}$$

Specific humidity is related to mixing ratio (and vice versa) by:

$$SH = \frac{MR}{1 + MR}$$

$$MR = \frac{SH}{1 - SH}$$

Humidity during rain

Humidity is a measure of the amount of water vapor dissolved in the air, not including any liquid water or ice falling through the air. For clouds to form, and rain to start, the air does have to reach 100% relative humidity, but only where the clouds are forming or where the rain is falling from. This normally happens when the air rises and cools. Typically, rain falls into air with less than saturated humidity. Some water from the rain may evaporate into the air as it falls, increasing the humidity, but not necessarily enough to raise the humidity to 100%. It is even possible for rain falling through warm, humid air to be cold enough to lower the air temperature to the dew point, thus condensing water vapor out of the air. Although that would indeed raise the relative humidity to 100%, the water lost from the air (as dew) would also *lower* the absolute humidity.

Dew point and frost point

Associated with relative humidity is dew point (If the dew point is below freezing, it is referred to as the frost point). Dew point is the temperature at which water vapor saturates from an air mass into liquid or solid usually forming rain, snow, frost, or dew. Dew point normally occurs when a mass of air has a relative humidity of 100%. This happens in the atmosphere as a result of cooling through a number of different processes.
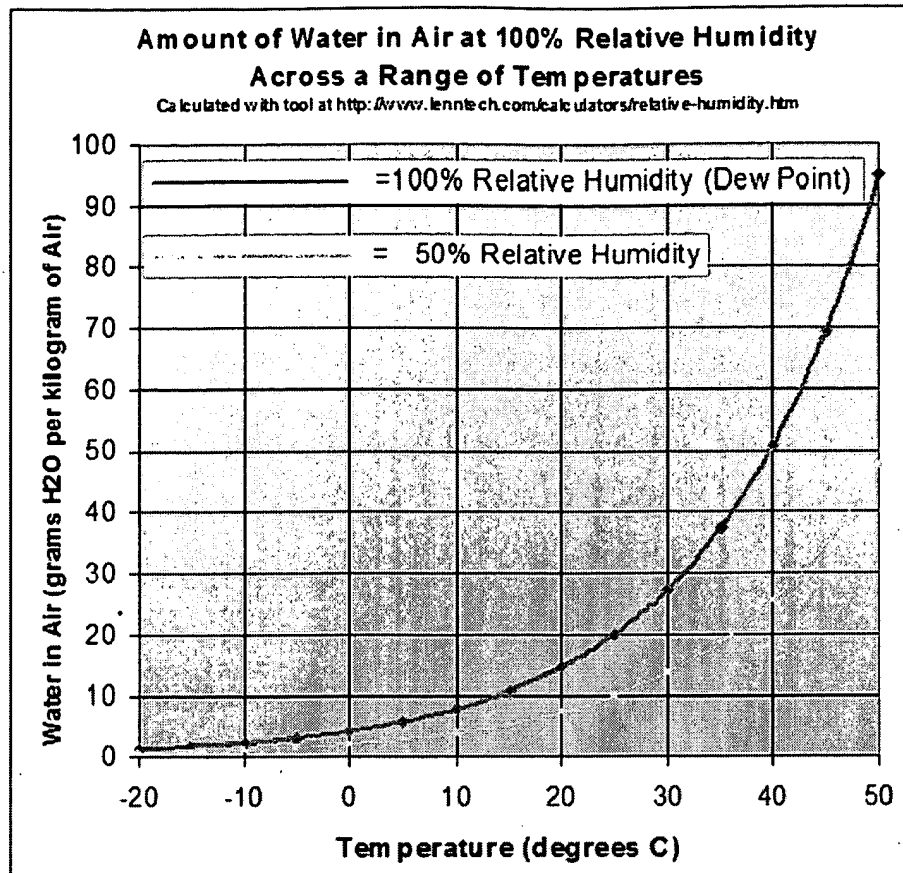
Measuring and regulating humidity

There are various devices used to measure and regulate humidity. A device used to measure humidity is called a psychrometer or hygrometer. A humidistat is used to regulate the humidity of a building with a de-humidifier. These can be analogous to a thermometer and thermostat for temperature control.

Humidity is also measured on a global scale using remotely placed satellites. These satellites are able to detect the concentration of water in the troposphere at altitudes between 4 and 12 kilometers. Satellites that can measure water vapor have sensors that are sensitive to infrared radiation. Water vapor specifically absorbs and re-radiates radiation in this spectral band. Satellite water vapor imagery plays an important role in monitoring climate conditions (like the formation of thunderstorms) and in the development of future weather forecasts.

Humidity and air density

Humid air is less dense than dry air because a molecule of water weighs less than molecules of nitrogen and oxygen. Isaac Newton discovered this phenomenon and wrote about it in his book *Opticks*.[1] Avogadro's ideal gas law states that a fixed volume of gas at a given temperature and pressure always contains the same number of molecules regardless of what type of gas it is. Consider a cubic meter of dry air. About 78% of the molecules are nitrogen (N_2), with a molecular weight of 28. Another 21% of the molecules are oxygen (O_2), with a

A hygrometer is a device used for measuring the humidity of the air

molecular weight of 32. The final 1% is a mixture of other gases. Combining these weights in the correct proportions gives an average molecular weight for air of about 29. If molecules of water vapor (H_2O), of molecular weight 18, replace the diatomic nitrogen or oxygen molecules in this fixed volume then the weight of the air decreases, and hence the density decreases. Thus, humid air has a lower density than dry air at a specified temperature and pressure.

Effects on human body

The human body sheds heat by a combination of evaporation of perspiration, heat convection in the surrounding air, and thermal radiation. Under conditions of high humidity, the evaporation of sweat from the skin is decreased and the body's efforts to maintain
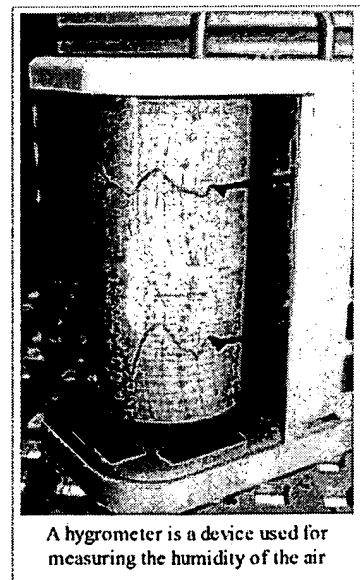
an acceptable body temperature may be significantly impaired. Also, if the atmosphere is as warm as or warmer than the skin during times of high humidity, blood brought to the body surface cannot shed heat by conduction to the air, and a condition called hyperpyrexia results. With so much blood going to the external surface of the body, relatively less goes to the active muscles, the brain, and other internal organs. Physical strength declines and fatigue occurs sooner than it would otherwise. Alertness and mental capacity also may be affected. This resulting condition is called *heat stroke* or hyperthermia.

Recommendations for comfort

Humans control their body temperature by sweating and shivering. The United States Environmental Protection Agency cites the ASHRAE Standard 55-1992 *Thermal Environmental Conditions for Human Occupancy*, which recommends keeping relative humidity between 30% and 60%, with below 50% preferred to control dust mites. At high humidity sweating is less effective so we feel hotter; thus the desire to remove humidity from air with air conditioning in the summer. In the winter, heating cold outdoor air can decrease indoor relative humidity levels to below 30%, leading to discomfort such as dry skin and excessive thirst.

Effects on electronics

Many electronic devices have humidity specifications, for example, 5 to 95%. At the top end of the range, moisture may increase the conductivity of permeable insulators leading to malfunction. Too low humidity may make materials brittle. A particular danger to electronic items, regardless of the stated operating humidity range, is condensation. When an electronic item is moved from a cold place (eg garage, car, shed) to a warm humid place (house), condensation may coat circuit boards and other insulators, leading to short circuit inside the equipment. Such short circuits may cause substantial permanent damage if the equipment is powered on before the condensation has evaporated. A similar condensation effect can often be observed when a person wearing glasses comes in from the cold. It is advisable to allow electronic equipment to acclimatise for several hours, after being brought in from the cold, before powering on. The inverse is also true.

Excessively high humidity causes corrosion in electronics. Low humidity favors buildup of static electricity, which may result in spontaneous shutdown of servers in data centres. Apart from spurious erratic function, electrostatic discharges can cause dielectric breakdown in solid state devices, resulting in irreversible damage. Therefore humidity is an important measure in the control of electronic production or data centre facilities.

Most humid places on Earth

See also: Humid subtropical climate and Humid continental climate

The most humid cities on earth are generally located closer to the equator, near coastal regions. Cities in South and Southeast Asia seem to be among the most humid. Kolkata, India; Kerala, India; and Bangkok, Thailand experience extreme humidity during their rainy seasons combined with warmth giving the feel of a lukewarm Sauna.[2] Darwin, Australia experiences an extremely humid wet season from December to April. Kuala Lumpur and Singapore have very high humidity all year round because of their proximity to water bodies and the Equator and overcast weather; despite sunshine, perfectly clear days are rare in these locations and it is often misty. In cooler places such as Northern Tasmania, Australia high humidity is experienced all year due to the ocean between mainland Australia and Tasmania. In the summer the hot dry air is absorbed by this ocean and the temperature rarely climbs above 30 degrees Celsius.

In the United States the most humid cities, strictly in terms of relative humidity, are Forks and Olympia, Washington.[3] This fact may come as a surprise to many, as the climate in this region rarely exhibits the discomfort usually associated with high humidity. Dew points are typically much lower on the West Coast than on the East. Because high dew points play a more significant role than relative humidity in the discomfort created during humid days, the air in these western cities usually does not feel "humid."

The highest dew points are found in coastal Florida and Texas. When comparing Key West and Houston, two of the most humid cities from those states, coastal Florida seems to have the higher dew points on average. But, as noted by Jack Williams of USA Today,[4] Houston lacks the coastal breeze present in Key West.

See also

- Savory brittleness scale

References

1. ^ Newton, Isaac (1704). *Opticks*. Dover.
2. ^ BBC - Weather Centre - World Weather - Average Conditions - Bangkok (http://www.bbc.co.uk/weather/world/city_guides/results.shtml?tt=TT002890)
3. ^ What Is The Most Humid City In The U.S.? | KOMO-TV - Seattle, Washington | News Archive (http://www.komotv.com/news/archive/4092941.html)

4. ^ USATODAY.com - Answers: Is Florida or Texas more humid (http://www.usatoday.com/weather/resources/askjack /2003-09-03-answers-fla-texas-humidity_x.htm)

- United States Environmental Protection Agency, "IAQ in Large Buildings" (http://www.epa.gov/iaq/largebldgs/i-beam_html /ch2-hvac.htm#F2.6) . Retrieved Jan. 9, 2006.

External links

- Glossary definition of absolute humidity (http://www.nsdl.arm.gov/Library/glossary.shtml#absolute_humidity) - National Science Digital Library
- Glossary definition of psychrometric tables (http://nsidc.org/arcticmet/glossary/psychrometric_tables.html) - National Snow and Ice Data Center
- Glossary definition of specific humidity (http://nsidc.org/arcticmet/glossary/specific_humidity.html) - National Snow and Ice Data Center

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